FACTORS INFLUENCING THE LABOR FORCE PARTICIPATION OF LOW-INCOME ADULTS ON PUBLIC HOUSING ASSISTANCE

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FACTORS INFLUENCING THE LABOR FORCE PARTICIPATION OF LOW-INCOME ADULTS ON PUBLIC HOUSING ASSISTANCE

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I would like to dedicate this work to my parents and my fiancée for their love, support, and care.

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LIST OF ABBREVIATIONS

AFDC	Aid to Families with Dependent Children
AHA	Atlanta Housing Authority
CIAP	Comprehensive Improvements Assistance Program
DOL	Department of Labor
FDI	Family Development Index
FMR	Fair Market Rent
HDI	Human Development Index
HUD	United States Department of Housing and Urban Development
LIHTC	Low Income Housing Tax Credits
MROP	Major Reconstruction of Obsolete Projects
MTCS	Multi-family Tenant Characteristic System
MTO	Moving to Opportunity program
NDI	Neighborhood Development Index
NDIGAP	Gap between two NDIs
PHAs	Public Housing Authorities
QHWRA	Quality Housing and Work Responsibilities Act
QLI	Quality of Life Index
RGI	Rent-Geared-to Income
SDI	Self-distinguishing Index
SSI	Self-selective Index
TANF	Temporary Assistance for Needy Families
UNDP	United Nations Development Program

VIF	Variance Inflation Factor

SUMMARY

This Paper analyzes the factors influencing the labor force participation of low-income adults on public housing assistance. A quasi-experiment is designed to fulfill the purpose of measuring the magnitudes of certain attributes of given individuals, e.g. the age in influencing employment status while controlling other factors such as other personal attributes and living environments. A number of logistic regressions are performed to assist the empirical analysis. Two final models are presented while statistical results are diagnosed to ensure the reliability of findings.

Based on the unique data provided by AHA (the Atlanta Housing Authority), over 70 variables are analyzed to determine their significance on influencing individuals' future employment status. Finally, we find five the most significant predictors to be the individual's current employment status, age, and income, whether one resides in a mixed-income community in comparison to living in a housing project, and whether one uses housing vouchers in comparison to living in a housing project. The individual's immediate living environment is found to play an extremely important role in shaping his/her future employment status. The results demonstrate that living in the mixed-income community as opposed to living in conventional public housing projects can boost one's odds of being employed in the future by 170% while using housing vouchers as opposed to living in traditional public housing can increase one's odds of being employed by 90%. Both statistics are significant even at the 0.001 level. Hence, our findings strongly support the view that environment matters and distressed public housing projects should be revitalized, which has been a controversial topic over years.

This study introduces an innovative index system-that consists of the Family Development Index (FDI), the Neighborhood Development Index (NDI), and the Quality of Life Index (QLI)-developed by Dr. Boston to show the development of low-income adults' socio-economic status and living environments induced by the revitalization of public housing projects in Atlanta over the period of 1995-2001.

Based on this innovative index system, this paper tentatively proposes a reasonable approach to separate the self-selective effect from the environmental effect in influencing the labor force participation, which has long been reckoned as a complex task in social science research. We create the Self-distinguishing Index (SDI) based on a similar mechanism by which Dr. Boston created the FDI and NDI and combine it with the FDI to generate the Self-selective Index (SSI). We also modify the NDI to serve our purpose of measuring the environmental changes at the personal level.

By this method, we successfully detach the self-selective effect from the environmental effect in determining the individual's future employment status. Those two effects are found to be significant at the 0.001 level and the 0.01 level respectively. A side-finding that individuals belonging to the treatment group have significantly better odds of being employed in the future is shown as well.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

In the United States, public housing is usually a block of purpose-built government subsidized housing operated by a government agency. Its initial purpose was to help poor citizens to house. But in some instance they have been found to have a direct negative impact on real estate property values in their surrounding neighborhoods, leading to urban decay and higher crime. Jobs and other opportunities to improve the socio-economics status are often not reachable for the residents in public housing projects. William Julius Wilson's research pointed out that the de-concentration of poverty enhances the socio-economic improvement and life opportunities of the poor (Wilson, 1987; 1991; 1997).

Public housing is long believed to be a program to concentrate poverty and inevitably lead to crime, squalor and destitution, with few exceptions[1]. In recent years, many such public housing projects have been torn down, revitalized or replaced under criticism that the concentration of poverty in economically depressed areas, poor management of the buildings, and government indifference have contributed to increased crime and poorness. It is commonly believed that concentrated poverty triggers a series of social and economic problems including crime, joblessness, welfare dependency, single-parent families, and antisocial behaviors (Boston, 2005).

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[1] One of the possibly notable exceptions is a housing development in Miami known as Modello (See Jack Pransky, 1998).

Wilson's research on concentrated poverty occupies a central point of reference for peer studies. Most of contemporary researchers agree with his description of the characteristics and consequences of concentrated poverty. However, they did not have a unanimous point of view about the mechanisms that create it and the effects of policies that are designed to reduce it (see Jacob, 2004; Oreopoulos, 2003; Goetz, 2003; Vale, 2002; Jargowsky, 1997; Ellen and Turner, 1997; Brooks-Gunn, et al., 1993; Case 1991).

Many researchers find neighborhood matters in shaping its residents life conditions and expectations. Ellen and Turner (1997) have found that quality of local services, socialization by adults, peer influences, social networks, exposure to crime and violence, and physical distance and isolation all play important roles in affecting the behaviors of individuals. For example, long-time exposure to crime and fear of victimization can have mental consequences and distort people's perception of societal norms. Individuals' behaviors and attitudes are influenced by peers since people tend to conform to the social norm (Oreopoulos, 2003).

1.1 Gautreaux and Moving to Opportunity

The two main housing mobility programs that researchers have evaluated intensively are the Gautreaux Assisted Housing Program and the Moving to Opportunity (MTO) program. There are several important differences between these two programs. For instance, MTO was set up as a randomized experimental design in five cities (Baltimore, Boston, Chicago, Los Angeles, and New York). However, their essential components are similar. In both programs families in public housing or on the waiting list

for public housing applied to a program that provided a section 8[2] subsidy to move into a privately managed unit (one third of MTO program participants were assigned to a control group and thus did not receive a subsidy). Gautreaux participants received a Section 8 subsidy they could use in predominantly White suburbs or predominantly African-American Chicago neighborhoods, depending on the unit that was available when their name was next on the waiting list. One-third of MTO participants (those in the experimental group) received a Section 8 subsidy that they could only use in a neighborhood that was less than 10 percent poor; another third could use their Section 8 subsidy with no geographical restrictions; and the remaining third continued to stay in their public housing units, as the control group (Clampet-Lundquist, 2004).

Only modest positive employment outcomes for adult participants in these programs have been found. There was a slight improvement in employment for suburban Gautreaux movers compared with city movers, but no increase in pay rates or number of hours worked (Clampet-Lundquist, 2004; Rubinowitz and Roesenbaum, 2000; Popkin, Rosenbaum, and Meaden, 1993; Welfeld, 1998).

Some well-known shortcomings of the research design of studies based on the Gautreaux program include the fact that residents self –selected into the program, many residents who participated in the program were not currently receiving housing assistance and most families that participated in the program did not move and those who did were likely to be the most highly motivated (Boston, 2005). Therefore, researchers had to

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[2] The Housing Choice Voucher Program is a type of Federal assistance provided by HUD dedicated to sponsoring subsidized housing for low-income families and individuals. It is more commonly known as Section 8, the reference to the portion of the U.S. Housing Act in which the program is authorized.

conduct only post move surveys due to the difficulty to track people from pre-to post move (Popkin, Buron, et al., 2002)

Researchers conducted an interim evaluation survey of MTO families across the five cities 4-7 years after they had signed up for the program. They found that there were no significant difference between experimental and control adults on employment measures, given the fact that families in the experimental group were in less poor neighborhoods than those in the control group (Jacob, 2004; Oreopoulos, 2003; Orr et al., 2003).

1.2 HOPE VI

Housing authorities across the country have spent a large part of the last decade demolishing distressed public housing projects to de-concentrate poverty and design new communities. Tenants were often relocated by the local housing authorities in the process of revitalizing the sites. Much of this demolition and redevelopment has been funded by the HOPE VI initiative, designed in 1992 by HUD (The United States Department of Housing and Urban Development).

Many of the elements of the program did not involve construction of buildings at all. More funding went to housing assistance vouchers than in previous programs. Like with the strategy of constructing in-fill housing in middle-class neighborhoods and providing new housing for market-rate buyers, this element conduced to the integration of residents into existing neighborhoods and the production of certain cohesion. In almost all implementations of the program, housing authorities and non-profits had provided resident-assistance information programs for new homeowners, teaching them and their neighbors how to take care of a house.

By 2001 HUD had awarded grants to 165 development projects in 98 cities, yet only a small percentage of these sites were fully developed. HOPE VI relocation and revitalization plans were uniquely formed by the joint effect coming from the political and social factors, and economic contexts of each locate. For example, not all HOPE VI sites required full-scale relocation.

The two main goals of HOPE VI led community revitalization in a comprehensive way: First, to transform public housing communities from depression and poverty into a vivid and integral part of larger neighborhoods; second, to create an environment that encourages and supports individual and family movement toward self-sufficiency (Epp, 1998).

Housing authorities might spend up to 20 percent of HOPE VI funding to support residents affected by demolition and revitalization. From site to site, the set of HOPE VI supportive services as well as the delivery and take-up of these services varied, but the common goal was to bring low-income families into self-sufficiency. Supportive services included job training, drug rehabilitation, childcare, and education programs (Clampet-Lundquist, 2004). Housing officials had invoked the mantra of mixed-income living as one of the best hopes for low-income families, whether in a development funded through HUD or in a privately owned Section 8-subsidized unit.

Families in public housing units where demolition or substantial rehabilitation would take place must relocate. They could choose from moving to another public housing site that not yet impacted by HOPE VI, renting private apartments with vouchers, and moving back into the revitalized development after it is completed.

On the surface, the HOPE VI initiative aims to revitalize severely distressed public housing in an effort to reduce the deleterious effects of concentrated poverty for the tenants and to encourage community development in the immediate area of projects targeted for revitalization. The reality of what has happened over the years, however, has been an emphasis on redeveloping the physical site to include mixed-income housing, rather than getting the original tenants into mixed-income neighborhoods. A section 8 subsidy could have allowed many relocated families to move to less poor privately owned units. However, in a study of 73 HOPE VI sites across 48 cities, Kingsley, Johnson, and Pettit (2002) found that nearly half of HOPE VI relocatees moved to other public housing developments. That means it seems that many moved to neighborhoods as impoverished as the ones they left. For those who chose section 8 housing, the poverty rates in their new neighborhoods were found to be, on average, lower than those in their original developments.

Revitalization raised several critical policy questions. First, given that its objective is to de-concentrate poverty, one question is whether revitalization causes a loss of housing assistance for families affected by it. Nationally, very little information is known about this process. In fact, HUD did not track residents affected by HOPE VI revitalization until 1998 and did not require grantees to report the location of residents until 2000 (U.S. GAO, 2003:8). Until recently, Dr. Boston's research demonstrated some substantial support for revitalization by showing that the retention rate on welfare assistance of people who were living in the projects where revitalization later took place was comparatively lower than that of those who were not.

In a recent report by the National Housing Law Project, the authors criticized the HOPE VI program. They pointed out that, "HOPE VI plays upon the public housing program's unfairly negative reputation and an exaggerated sense of crisis about the state of public housing in general to justify a drastic model of large scale family displacement and housing redevelopment that increasingly appears to do more harm than good." (National Housing Law Project, 2002) The report asserted that empirical data to support the claims of HOPE VI was lacking.

The absence of empirical research on the socio-economic effects of HOPE VI mixed-income revitalization had led some researchers to argue its merits by pointing to the improved housing conditions and neighborhood attributes, the reduction in concentrated poverty, and decrease in crime and other indices of neighborhood distress. On the other hand, critics of HOPE VI have focused on the net loss of on-site housing for assisted residents. They argue that the loss is a direct result of mixed-income development (Keating, 2000; Keating and Flores, 2000).

Unfortunately, very little definitive research existed on the effects of the $4.5 billion HOPE VI Program--the nation's largest residential mobility program (Clampet-Lundquist, 2004; Popkin, Katz, et al., 2004; Brooks, Wolk and Adams, 2003; Holmes, Moody, et al., 2003; Buron, Popkin, et al., 2002; Popkin, Levy, et al., 2002). The main objectives of this program were to de-concentrate poverty, create more vital communities for public housing assisted families and build sustainable neighborhoods. Under HOPE VI, 98 public housing authorities (PHA's) received awards between 1993 and 2001 from HUD. By 2001 only a small percentage of these sites were fully developed and Atlanta led the nation in the number of fully developed mixed-income revitalized communities.

In recent years, several studies had used resident surveys to longitudinally track the effect of HOPE VI mixed-income revitalization on original residents of public housing projects (Brooks, Wolk and Adams, 2003; Holmes, Moody, et al., 2003; Buron, Popkin, et al., 2002). Because these studies were designed to track residents longitudinally over a long period of time, they were not yet able to provide definitive answers to how HOPE VI had affected public housing assisted families. A recently released report summarizing the state of knowledge on the effect of HOPE VI revitalization concluded the following:

The question of what has happened to the original residents of the revitalized HOPE VI developments has become a major – and contentious – focus of concern as uncertainty over the future of the program continues. To date, approximately 49,000 residents have been relocated from HOPE VI properties across the United States. Unfortunately, there is only limited information about how these residents have fared, although early analysis suggests that relatively few will return to the revitalized HOPE VI developments. The lack of consistent and reliable administrative data on housing and neighborhood outcomes for the original residents has muddied the debate about the performance of HOPE VI, and makes it difficult for policymakers to reach informed decisions about whether and how the implementation of the program should be improved. (Popkin et al., 2004:27).

The present research is conducted to help fill the gap regarding the effect of HOPE VI mixed-income revitalization on public housing assisted families.

CHAPTER 2

STUDY DESIGN AND OBJECTIVE

This study is based on a longitudinal examination of families who lived in six public housing projects in Atlanta in 1995. Three of these housing projects were revitalized into mixed-income communities between 1995 and 2001 and three were not. The housing situation and socio-economic status of each family was traced over the seven-year period along with the characteristics of the neighborhood where the family resided.

The study used primary data collected by AHA on all families who received housing assistance between 1995 and 2001; a yearly average of about 20,000 families and 50,000 household members. These data were collected by the MIS Department of AHA upon the initial certification or re-certification of each family that received housing assistance. Once compiled, the data were provided directly to Dr. Boston in Economics at Georgia Institute of Technology. Multi-Family Tenant Characteristic System (MTCS) data, that public housing authorities are required to report to HUD and that have often been criticized for its inaccuracy, were not used in this report.

The quasi-experimental design was used to examine families who lived in the three housing projects that were revitalized in comparison to families who lived in three housing projects that were not revitalized. This consisted of 2,718 families who were divided into two groups (a treatment group and a control group). These groups were examined longitudinally between 1995 and 2001. The treatment group consisted of 1,235 families who lived in three housing projects in 1995. The demolition of these three

projects and relocation of their residents occurred after the initial observation period which was December 31, 1995. The control group consisted of 1,483 families who lived in three projects in 1995 that were not revitalized during the observation period, December 31, 1995 to December 31, 2001.

Four criteria were used to select the public housing projects that were placed in the treatment group and the control group: (1) The average characteristics of the treatment group and control group families who resided in the public housing projects in 1995 were similar. (2) Housing projects selected for the treatment group were still intact in 1995. That is, the relocation of families and demolition phase of revitalization had not started at the initial observation point; (3) Revitalization of communities in the treatment group was fully completed prior to December 31, 2001 (the end point of our data observation); and (4) Communities in the comparison group did not undergo revitalization during the seven year study period.

The study is designed to examine four main questions:

1. What are the main factors that influence the labor force participation of low-income adults on public housing assistance?
2. Do people living in the mixed-income communities or using vouchers to house have better chance to be employed than those living in the conventional public housing projects? In other words, does environment matter in determining one's future employment status?
3. Can a significant portion of the improvement in socio-economic status accompanying residential mobility be attributed to the change in environment as distinct from the selectivity of the movers? If so, how to separate those two

effects to find the real magnitude of each effect in influencing the labor force participation?

4. How do people belonging to the treatment group differ from those assigned to the control group in their chance of being employed?

CHAPTER 3

THE STATE OF PUBLIC HOUSING IN THE UNITED STATES

Public housing was only built with the blessing of the local government, and projects were almost never built on suburban greenfields, but through regeneration of older neighborhoods. The destruction of tenements and eviction of their low-income residents consistently created problems in nearby neighborhoods with "soft" real estate markets. Houses, apartments or other residential units are usually subsidized on a rent-geared-to-income (RGI) basis. Some communities have now embraced a mixed income, with both assisted and market rents, when allocating homes as they become available.

U.S. public housing continues to have a reputation for violence, drug use, and prostitution, leading to the passage in the U.S., in 1996, of a federal "one strike you're out" law, calling for the eviction of tenants convicted of crimes, especially drug-related. Such a loss can also occur merely as a result of being tried for some crimes, which is a subset of the collateral consequences of criminal charges.

Public housing was initiated in the 1930s to help stimulate the depressed economy, clear slums, and provide low-rent housing options. Today there are 3,400 PHAs that manage 13,900 housing projects. These projects contain 1,300,000 units and approximately 3 million persons. While most public housing is adequate, some is severely distressed and in need of substantial rehabilitation or replacement. (Schussheim, 2000:9).

Federal housing assistance programs began during the Great Depression to address the country’s housing crisis. In the 1960s and 1970s, the federal government

created subsidy programs to increase the production of low-income housing and to help low income families pay their rent. In 1961, the Section 23 Leased Housing Program amended the U.S. Housing Act of 1937. This subsidy program, the predecessor to Section 8, was not a pure housing allowance program. Housing authorities selected eligible families from their waiting list, placed them in housing from a master list of available private units, and determined the rent that tenants would have to pay. The housing authority would then sign a lease with the private landlord and pay the difference between the tenant's rent and the market rate for the same size unit. In the agreement with the private landlord, housing authorities agreed to perform regular building maintenance and leasing functions for Section 23 tenants, and annually reviewed the tenant's income for program eligibility and rent calculations.

In the 1970s, when studies showed that the major low income housing crisis was no longer substandard housing, but the high percentage of income spent on housing, Congress passed the Housing and Community Development Act of 1974, further amending the U.S. Housing Act of 1937 to create the Section 8 Program. In the Section 8 Program, tenants pay about 30 percent of their income for rent, while the rest of the rent is paid with federal money.

The Section 8 program initially had three subprograms — New Construction, Substantial Rehabilitation, and Existing Housing Certificate programs. The Moderate Rehabilitation Program was added in 1978, the Voucher Program in 1983, and the Project-based Certificate program in 1991. The numbers of units a local housing authority can subsidize under its Section 8 programs is determined by Congressional funding. Since its inception, some Section 8 programs have been phased out and new

ones created, although Congress has always renewed existing subsidies. Currently, the two main Section 8 programs are tenant-based vouchers and project-based vouchers.

A Public Housing Authority can choose to project-base up to 25% of its total vouchers, meaning that the vouchers are linked to a particular apartment. Eligible families pay 30% of their income while living in the apartment, but cannot take that voucher with them to another complex or private residence.

Under the tenant-based program, eligible families with a certificate or voucher find and lease a unit in the private sector and pay a portion of the rent (based on income, generally around 30%). The local housing authority pays the owner the remaining rent, subject to a cap referred to as "Fair Market Rent" (FMR) which is determined by HUD. The owner cannot charge a Section 8 tenant more than FMR, even if the owner does so for non-Section 8 tenants in similar units.

The Quality Housing and Work Responsibilities Act of 1998 (QHWRA) merged the Section 8 Program into the Housing Choice Voucher Program and, starting in 2000, phased out of the former program by recertifying Section 8 families into the new voucher program (Boston, 2005).

QHWRA includes a provision that was designed to encourage residents to increase their labor force participation by reducing the disincentive for working. It stipulates that the increased employment income received by adult family members be disregarded for 12 months after their income improves, and following the 12-month period, a rent increase is phased in over a two-year period. Instead of an income disregard, the resident may request that the Authority establish an individual savings account for the family. Also, a tenant may annually choose to pay a flat rent rather than a

rent based on income. The new regulations enable PHAs to obtain police records to screen applicants and to evict residents who use drugs, abuse alcohol or whose household members engage in criminal activities. Also, PHAs are authorized to establish their own preferences regarding admission of tenants and to disregard previous federal preference for families with the most severe hardships. (Schussheim, 2000).

CHAPTER 4

PUBLIC HOUSING IN ATLANTA

4.1 General Information

The Atlanta Housing Authority (AHA) is currently involved in one of the nation's most ambitious attempts to revitalize distressed public housing into mixed-income communities. By the end of 2002, four of the nation's 15 fully completed HOPE VI funded sites were located in Atlanta. To date, AHA has revitalized seven conventional public housing projects and created nine new mixed-income communities in their place. These new communities contain 3,404 units of mixed-income, mixed-financed apartments. Forty and sixth-tenths percent (40.6%) of the units are reserved for public housing eligible residents, 23.1% are rent subsidized and 36.3% are leased at market rates. In addition, AHA is currently revitalizing three more conventional public housing projects that will add 2,433 mixed-income rental units; 32% of which will be reserved for public housing eligible residents, 28% will be rent subsidized and 40% leased at market rates. Accompanying these rental units, the Authority plans to construct 1,435 for sale homes; 15% of which will be affordable (Boston, 2005).

In 1994, an Inspector General's Audit Report of AHA properties (conducted by HUD) found conditions so unsafe, unsanitary and poorly managed that the Authority was almost taken over by the federal government (i.e. placed in receivership). Eighty eight percent (88%) of inspected units did not meet minimum safety and sanitary standards, and 7,100 maintenance work orders were backlogged. Many units were simply boarded up, and others had missing or defective windows and doors, electrical hazards, leaking

and backed up toilets, rodent infestations, and lead-based paint exposures. The poor housing conditions were compounded by extreme social and human circumstances. In the housing projects, residents lived in constant fear of gunfire and violence. The probability of being the victim of a crime was very high as one crime occurred for every 4 persons living in housing projects. By the 1980's drug traffickers operated out of the housing projects; some used small children as lookouts (Office of Audit, 1994). Only 13% of household heads 62 years of age and younger worked and 36% depended upon welfare as a primary source of income. Eighty-six percent (86.0%) of households were headed by single women, and children less than 16 years of age accounted for 49% of all residents.

A 1992 Atlanta Police Department crime report indicated that among the 15 largest AHA projects (each with 500 or more housing units) 5,810 crimes were committed. These included 1,031 narcotic arrests. In the housing projects, the crime rate of .269 per resident was 12% higher than the per capita crime rate of the City of Atlanta; and Atlanta had one of the nation's highest rates. In the adjoining housing projects of Techwood/Clark Howell Homes (AHA's most crime plagued properties) the crime rate was .393 per capita; 69% above the City's average. In 1992, Techwood/Clark Howell projects alone accounted for 5,654 Atlanta Police Department dispatches. This was 4.9% of the City's total police responses that year. Yet the 2,170 residents of Techwood/Clark Howell represented only one-half of one percent (.5%) of the City's population (AHA, 1993: 82-83).

In 1994, Renee Glover was appointed the new Executive Director of AHA. Under her leadership, the Authority pursued a radically different approach to providing housing services. Several elements distinguished her approach. First, she argued that conventional

public housing projects had not mainstreamed families as intended. Instead, housing projects had served as “warehouses for the poor.” Second, she maintained that the population density, concentrated poverty and squalid housing conditions of the projects had produce a cycle of social disorders that was impossible to break by simply rehabilitating the housing units. Therefore, conventional public housing properties had to be demolished and revitalized mixed-income communities must be built in their place. Third, while it was absolutely necessary to reconstruct the physical environment of public housing properties, she maintained that the highest priority should be placed on improving the human condition of families. Fourth, she argued that sustainable communities could not be achieved if AHA focused on building affordable housing for the poor. Instead, the focus should be on building market rate housing with an affordable component integrated seamlessly. The market responsiveness of the properties would force management to adopt efficient policies and practices. (Glover, 2002).

Formally, AHA announced three objectives of mixed-income revitalization:

1. To de-concentrate poverty and eliminate the stigma associated with public housing;
2. To create public/private partnerships;
3. To rebuild communities, not just housing.

To accomplish these objectives AHA worked in concert with private development partners and leveraged a variety of HUD funds.

The HOPE VI Program, authorized in 1992, liberalized mandates requiring one-for-one replacement of public housing units and encouraged creative solutions to address the crisis in the nation’s distressed public housing projects. While the new federal

program still fell short of the regulatory changes needed to successfully implement AHA's mixed-income revitalization program, it provided many essential elements. AHA tapped into the resources of this new program and at the same time lobbied HUD to make further regulatory changes. One important regulatory change AHA pursued successfully allowed the Authority to use Section 8 and housing choice vouchers to relocate families during the demolition of projects. This option made it possible for families to move out into the city rather than confining them to other conventional housing projects (Boston, 2005).

AHA used private development partners to design, develop and manage its mixed-income communities. The development funding sources include HOPE VI Grants and other HUD sources that were leveraged with private equity, private debt and tax credit funding[3]. Its approach to financing revitalization has become known as the mixed-income, mixed-financed financial model. The financing strategy combines private sector and public sector resources. Development financing is accomplished by creating a real estate partnership separate from AHA. The limited partners, created through the sale of Low Income Housing Tax Credits (LIHTC), own a 97% share of the development. The management of the mixed-income communities is privatized, and AHA receives a portion of the developer's fee and a share of the net operating income. AHA enters into a 55-year ground lease of its properties. After this period, the land and all capital improvements revert back to the Authority. The conditions of the ground lease guarantee

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[3] Seed funds for the revitalization have come from a variety of HUD sources including HOPE VI funds, Comprehensive Improvements Assistance Program (ClAP) funds, public housing development funds and Major Reconstruction of Obsolete Projects (MROP) funds.

that the agreed upon percentage of rental units will be reserved for low-income families. Accompanying the new development strategy, AHA initiated three major steps to transform its property management operations. First, it decentralized management and moved towards site-based management and project-based budgeting. Second, it selected private companies to manage the day-to-day operations and capital improvement work at its properties. Third, it restructured its departments of finance, budgeting and accounting, contracting and purchasing, and information management systems. The aim was to improve compliance and accountability[4] (Boston, 2005).

In 1996, AHA began outsourcing the management of its communities. By July 1, 2001, professional management agents were privately managing 100% of AHA's properties. These companies perform all of the management and maintenance functions (including resident services programs) and the capital improvement work at AHA-owned properties. Once completed, revitalization in Atlanta will replace 6,418 on-site rental units designated for public housing assisted families with 5,837 mixed-income rental units; 2,256 of which are reserved for public housing eligible residents. Clearly, all the original families who lived in housing projects will not be able to move into the mixed-income communities. Families who do not move into the mixed-income communities can elect one of two options. First, they can use Housing Choice Vouchers, which will allow them to relocate to suitable rental property in the metropolitan area, or beyond—given the new portability feature of vouchers. Second they may elect to relocate to conventional

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[4] By 1998 the Authority was removed from HUD's Troubled Housing Authorities List and was recognized by HUD as a High Performing Housing Authority. In June 1999, AHA's performance score reached 100%.

housing projects that have not been revitalized. This report found that 60% of the families affected by revitalization chose housing vouchers (Boston, 2005).

AHA's uses the Housing Choice Program to supplement the loss of on-site housing resulting from mixed-income revitalization. This has accelerated the move towards housing vouchers in Atlanta. Table 4.1 indicates that in 1995, 33% of assisted families used vouchers. By 2001, this had increased to 57%. During the same period, the number of persons receiving housing assistance from AHA increased by 33.1% (from 43,233 to 57,592), while the population of Fulton County increased by just 17%.

Table 4.1: Baseline Conditions-AHA Assisted Families

1995: 16,355 families and 43,233 individuals
67%-Public Housing Projects
33%-Housing Vouchers
2001: 18,226 families and 57,592 individuals
38%-Public Housing Projects
57%-Housing Vouchers
5%-Mixed-income Communities

Note: Table was made based on the data provided by Dr. Boston.

Three housing projects scheduled for revitalization are the Clark Howell Homes, the John Eagan Homes, and the East Lake Meadows, and therefore form the treatment group in our study. All the revitalization had been completed by 2001. Another three

public housings did not experience the revitalization make up the control group in our study. They are the Grady Homes, the Bowen Homes, and the McDaniel Glen. Some descriptive data about these housing projects are shown in Table 4.2.

Table 4.2: Some Descriptive Data about Housing Projects in the Treatment Group and the Control Group

1995 Origin Housing Project	Assisted Families in 1995	Still Active in 2001	% of 1995 Cohort Still Active in 2001
Treatment Group			
Clark Howell	478	270	56%
John Eagan Homes	370	199	54%
East Lake Meadows	387	179	46%
Total	1235	648	53%
Control Group			
Grady Homes	482	222	46%
Bowen Homes	577	291	50%
McDaniel Glen	424	217	51%
Total	1483	730	49%

Note: Table was made based on the data provided by Dr. Boston.

4.2 The Labor Force Participation of AHA Assisted Families

Table 3 illustrates the employment of AHA heads of households 62 years of age and younger in comparison to Georgia and Metro Atlanta employment-to-population ratios. The Department of Labor (DOL) measures the employment-to-population ratio as the number of persons employed divided by total non-institutional population 16 years of age and older. We measured the employment status of AHA assisted residents as those who are household heads, 62 years of age or younger whose primary income source was wages for labor services during the current year. We recognize that the two definitions of employment differ somewhat. However, this is the closest approximation that we are able to make to the DOL's definition, given the information available on AHA assisted families. Table 4.3 indicates how employment differs among assisted residents in the three housing programs and compares these to labor forces in Metropolitan Atlanta and the State of Georgia. In 2001, employment was 21.1% for individuals in Conventional Housing, 44.6% for individuals in the Voucher Program, and 63.6% for residents in mixed-income communities. In comparison, the employment-to-population ratio was 65.3% for all Georgia employees in 2001 and 71.7% percent for employees in the Metro-Atlanta area in 2000[5] (Boston, 2005).

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[5] The latest employment-to-population figures available for the Metro-Atlanta area are for 2000. Georgia DOL ceased publishing this ratio in 2001.

Table 4.3: Employment Percentage of AHA Heads of Households in Comparison to Georgia and Metro Atlanta

Year	Conventional Housing	Vouchers	Mixed Income	Georgia	Atlanta
1995	14.0%	12.1%	*	63.8%	69.6%
1996	15.4%	28.3%	*	64.7%	71.0%
1997	18.5%	36.5%	*	66.1%	70.8%
1998	21.7%	39.8%	54.0%	66.9%	71.2%
2000	21.8%	43.0%	62.7%	67.4%	71.7%
2001	21.1%	44.6%	63.6%	65.3%	n/a

Note: Table was made based on the data provided in the working paper of Dr. Boston. See reference: Boston, 2005.

Tables 4.4 and 4.5 list the change in nominal and real earnings received by AHA assisted families between 1995 and 2001. These tables are based on all individuals who had labor market earnings during the year as their primary source of income. In Table 4.4 earnings are given in nominal dollars while the amounts in Table 4.5 are converted to real or inflation-adjusted dollars.

Table 4.4: Nominal Earnings of AHA Assisted Heads of Households (Dollars)

	Conventional Housing	Vouchers	Mixed Income	Group Average	CPI (1995 Base Year)
1995	8,628	11,729	.	10,353	100
1998	9,792	12,484	12,181	11,732	106
2000	11,218	13,373	14,858	13,003	112
2001	11,388	14,416	15,511	13,932	113
% Increase 1998 to 2001	16.3%	15.5%	27.3%	18.8%	6.7%

Note: Table was made based on the data provided in the working paper of Dr. Boston. See reference: Boston, 2005.

Table 4.5: Real Earnings of AHA Assisted Heads of Households (Dollars)

	Conventional Housing	Vouchers	Mixed Income	Group Average
1995	8,628	11,729	.	10,353
1998	9,238	11,777	11,492	11,068
2000	10,016	11,940	13,266	11,610
2001	10,078	12,758	13,727	12,329
% Increase 1998 to 2001	9.1%	8.3%	19.4%	11.4%

Note: Table was made based on the data provided in the working paper of Dr. Boston. See reference: Boston, 2005.

In 2001 the annual nominal earnings of individuals in mixed-income communities was $15,511, and their real earnings was $13,727. These amounts exceeded the earnings of individuals in the Voucher Program ($14,416 nominal and $12,758 real). Besides, earnings of individuals in mixed-income communities and in the Voucher Program

exceeded those of individuals in Conventional Housing ($11,388 nominal and $10,078 real). Residents in mixed-income communities also experienced the greatest growth in real earnings between 1998 and 2001, 19.4% as opposed to 8.3% for voucher holders and 9.1% for families in conventional public housing.

CHAPTER 5

FACTORS INFLUENCING THE LABOR FORCE PARTICIPATION OF LOW-INCOME ADULTS ON PUBLIC HOUSING ASSISTANCE

In his working paper, Dr. Boston conducted a logistic regression analysis to find factors that significantly influenced employment based on the AHA data collected during 1995-2001. He used the logarithm of the odds of being employed in 2001 as the depend variable and several individuals' attributes factors as the independent variables including: disability status in 1995, years of age in 1995, welfare dependency status in 1995, gender, whether one resides in a mixed-income community in comparison to living in a housing project in 2001, and whether one uses housing vouchers in comparison to living in a housing project in 2001 (See Boston, 2005). The results illustrated that when families move away from public housing projects by using vouchers or by moving to mixed income communities, their move is associated with significant improvements in employment. Besides, the individual's age is another significant factor that influences employment status in 2001.

Dr. Boston's analysis produced reasonable results as expected. However, we find the base model of his analysis may not be well founded. In his initial analysis, he did not include a very important independent variable, which is the individual's employment status in 1995 to predict one's odd of being employed in 2001.

5.1 Factors Influencing the Labor Force Participation

We conduct another logistic regression based on the same data Dr. Boston used. Similarly, we use the odds of being employed in 2001 as the dependent variable. After doing the step-wise selection of independent variables, we focus on a bundle of the individual's attributes in 1995 as the independent variables, including the employment status, the age, the income, whether the primary source of income is AFDC or TANF[6], the gender, the race, and the marriage status. Besides, whether one resides in a mixed-income community in comparison to living in a housing project, and whether one uses housing vouchers in comparison to living in a housing project in 2001 are included in the model as additional independent variables.

The results in Table 5.1 show that the employment status and the age in 1995, whether one resides in a mixed-income community in comparison to living in a housing project, and whether one uses housing vouchers in comparison to living in a housing project in 2001 are significant even at the 0.001 level.

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[6]Aid to Families with Dependent Children (AFDC) was the name of a federal assistance program in effect from 1935 to 1997, which was administered by the United States Department of Health and Human Services. Temporary Assistance for Needy Families (TANF) is the July 1, 1997, successor to the Aid to Families with Dependent Children program, providing cash assistance to poor American families with dependent children through the United States Department of Health and Human Services.

Table 5.1: Logistic Regression (A): Factors Influencing Employment Status

Dependent Variable: The Odds of Being Employed in 2001 Log Likelihood = -653.22216		Number of Observations: 1149 LR chi2(9) = 196.67
Variable	Coefficient	Odds Ratio
EMPLOYED95	1.72*** (0.25)	5.59*** (1.42)
AFDCTANF95	0.04 (0.20)	1.04 (0.21)
GENDER	0.05 (0.38)	1.05 (0.40)
INCOME95	-2.57E-06 (2.38E-05)	1.00 (2.38E-05)
RACE	-0.53 (0.44)	0.59 (0.26)
YEARSAGE95	-0.05*** (0.01)	0.95*** (0.26)
MARRIED95	0.19 (0.49)	1.21 (0.26)
MIXEDINC01	0.96*** (0.25)	2.61*** (0.66)
VOUCHER01	0.61*** (0.15)	1.84*** (0.27)
CONSTANT	0.95 (0.92)	

Note: *** indicates significant at the 0.001 level.

To better structure the model, we exclude the gender, the race, the marriage status, and whether the primary source of income is either AFDC or TANF in 1995 to form a restricted model. After conducting a likelihood ratio test, the results show that the restricted model passes the test and indicate a nice fit of data almost as good as the full model does. Table 5.2 shows that the chi-square statistic equals 4.82, which is statistically insignificant. This means that the variables that are removed to produce the reduced model result in a model that does not produce a poorer fit, and therefore the variables could be excluded from the model.

Table 5.2: Likelihood-ratio Test Results Indicating a Better Structured Restricted Model (A)

Likelihood-ratio Test	LR chi2(4) = 4.82
Assumption: the restricted model is nested in the full model	Prob > Chi2 = 0.3065

The new model reveals another important variable that significantly influences the labor force participation. It is the income in 1995, as shown in Table 5.3.

Table 5.3: Logistic Regression (B): Factors Influencing Employment Status

Dependent Variable: The Odds of Being Employed in 2001		Number of Observations: 1376
Log Likelihood = -696.91752		LR chi2(6) = 290.97
Variable	Coefficient	Odds Ratio
EMPLOYED95	2.21*** (0.24)	9.10*** (1.99)
INCOME95	-4.58E-05* (2.35E-05)	1.00* (2.35E-05)
YEARSAGE95	-0.06*** (0.01)	0.94*** (0.01)
MIXEDINC01	0.99*** (0.24)	2.70*** (0.66)
VOUCHER01	0.64*** (0.14)	1.90*** (0.27)
CONSTANT	0.91*** (0.25)	

Note: * indicates p-value ≤ 0.05, ** indicates p-value < 0.01, and *** indicates p-value < 0.001.

The model produces a nice fit for the data, as shown in Tables A.1-A.4 in Appendices A, in which the link test, the Hosmer and Lemeshow's goodness-of-fit test, and the multicollinearity test are performed, and the fit statistics are specified. The link test statistic is significant, which may indicate misspecification to some extent. However, it does not mean that our model is not adequate. Our model makes good economic sense and the following-up Hosmer and Lemeshow's Goodness-of-fit test shows a p-value of 0.23, which is big enough to indicate that our model fits the data well. Small values of VIF (variance inflation factor) and big values of tolerance guarantee that there is no significant problem of multicollinearity in our model.

To conclude, we find that the person's employment status, income, and age in 1995, plus, whether one resides in a mixed-income community in comparison to living in a housing project, and whether one uses housing vouchers in comparison to living in a housing project in 2001 are all highly significant factors that influence the labor force participation in 2001. The results demonstrate that living in the mixed-income community as opposed to living in conventional public housing projects can boost one's odds of being employed in the future by 170% while using housing vouchers as opposed to living in traditional public housing can increase one's odds of being employed by 90%. Both statistics are significant even at the 0.001 level. Hence, we conclude that both one's certain attributes and his/her immediately environment matter in determining his/her future employment status.

Neat as it is, the above regression results display a number of variables responsible for the employment development of low-income adults in Atlanta. However, as what Dr. Boston stated in his work-while it is tempting to conclude that the change in

environment associated with the change in housing assistance program is responsible for the significant increase in labor force participation, one has to first account for selective attributes of the movers, the magnitudes of one's attributes and one's immediate environment in influencing one's future labor force participation, i.e., one's self-selective effect and the environmental effect, are still left to be measured.

It is crucial to distinguish between these two effects to find the significance of AHA's revitalization of public housing projects on improving the labor force participation of low-income adults. It is reasonable to assume that individuals having better endowment of skill sets and strong motives to fight for better life and some other personal traits, i.e., more driven individuals are likely to move voluntarily from the distressed traditional public housing to vouchers or mixed-income communities. Those are also the individuals who are likely to be employed in the long run. Therefore, accounting for this kind of "self-selective effect" is extremely important for telling the true role the environment played in shaping the labor force participation of people. But it is a unanimously believed complex task in social science research because such selective attributes are hard to observe and measure.

5.2 An Index System

Dr. Boston offered a tentative method to gain certain insight into this issue by observing the same selective individuals in different environments and then measuring the difference in socio-economic achievement in each environment. He observed the labor force participation of individuals with selective attributes when they lived in a public housing project and observed it again shortly after they moved by using vouchers or to mixed-income communities. He pointed out that a significant change in labor force

participation would not be seen if the environment does not make a difference. By this method, he successfully showed the environment matters in improving the employment status of low-income adults in Atlanta. But we still cannot scale the magnitude of environmental effect in comparison to the self-selective effect.

In this study, we tentatively propose another approach to this issue based on Dr. Boston's research, in which he introduced in an innovative and well-founded index system to measure the socio-economic status of poor adults receiving housing assistance. His index system consists of three different indices, which are the family development index (FDI), the neighborhood development index (NDI), and the quality of life index (QLI).

These indices have been derived from the Human Development Index (HDI). The HDI was created by the United Nations Development Program (UNDP) to capture the complex realities in which people live by reflecting the progress of a country in terms of longevity, knowledge and standard of living.

Goalposts are established for each dimension of the HDI. These goalposts allow the actual measurement to be converted to a score between 0 and 1. For example, suppose in measuring life expectancy, the minimum value is set at 25 years, the maximum value is set at 85 years and the actual measured average life expectancy for a country is 73.4 years. In this case, 25 years in the minimum goalpost and 85 years is the maximum goalpost. The index value for life expectancy is then derived as follows:

$$\text{Life expectancy index} = \frac{(73.4 - 25)}{(85 - 25)} = 0.807$$

By establishing a minimum and maximum value, the index score will always range between 0 and 1. Using this procedure, a numerical index is derived for each dimension and the average of all indexes is the HDI[7].

Like HDI upon which it is based, FDI, NDI, and QLI were created to convey the idea that revitalization is a multi-dimensional process. It has been recognized that too often officials of PHA's and other housing policy officials and practitioners have used only the poverty rate and racial composition of neighborhoods to benchmark the social and economic progress of families involved in residential mobility. The FDI, NDI, and QLI have been designed to overcome this limitation (See Boston, 2005).

The FDI, NDI, and QLI are different from the HDI in two aspects. First, they take into account more dimensions than does the HDI. Second, they are measured at the micro level, i.e. family and neighborhood level, rather than at the national level.

The FDI is used to measure the economic well-being of AHA assisted families according to the housing program that they participate in. The dimensions of the FDI are:

1. Employment Index: This is measured as the percent of household heads whose primary source of income is from labor market services. The respective minimum and maximum goalposts were 0 and 100 percent.
2. Index of Household Income: There are two dimensions of household income. One is the total income, which is measured as total income of the household from all

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[7] See, United Nations Development Program (UNDP). 2003. Human Development Report, 2003, Millennium Development Goals: A Compact Among Nations to End Human Poverty; Technical Note 1, pp340-344. (New York: United Nations). See also, Thirwall, A.P. 2003. Growth and Development: With Special Reference to Developing Economics. (New York: Palgrave MacMillan).

sources including TANF, social security, child support and others. The other is the earned income from labor services. One third of the index value is given to total income and two-thirds is given to earned income. The minimum goalpost was $0 while the maximum goalposts were $22,275 for 1995 observations and $34,770 for 2001 observations. These values were based on the median household income for the City of Atlanta.

3. Poverty Index: The percent of families below the poverty line. The poverty threshold is based on a three person family. The 1995 poverty threshold was $10,080, while the 2001 threshold was $11,610. The respective minimum and maximum goalposts were 0 and 100 percent. The index value was subtracted from 1 so that higher values connote more positive outcomes.
4. Income Gap Ratio: The income gap is the total income required to bring a family to the poverty line, expressed as a percent of the poverty line. The deficit is calculated for families in poverty only. The respective minimum and maximum goalposts were 0 and 100 percent. The index value was subtracted from 1.
5. Welfare Dependency Index: It is the percent of families whose primary source of income is public assistance. The respective minimum and maximum goalposts were 0 and 100 percent. The index value was subtracted from 1.

The FDI is the average of the all the indices above.

The NDI is based on the Census Block Group characteristics where the family resided. The family's place of residence in 2001 was merged with 2000 census data while the place of residence in 1995 was merged with 1990 census data. The intent was to

capture the neighborhood characteristics immediately surrounding the family. All Census Block Groups were populated. The dimensions of this index are:

1. Poverty Index: It is the percent of families in the Census Block Group at or below the poverty line. The respective minimum and maximum goalposts were 0 and 100 percent. The index value was subtracted from 1.
2. Welfare Dependency Index: It is the percent of families in the Census Block Group that are dependent upon welfare. The respective minimum and maximum goalposts were 0 and 100 percent. The index value was subtracted from 1.
3. School Attendance Index: Percent of individuals 3 years to 20 years of age residing in the Census Block Group that is enrolled in school. The respective minimum and maximum goalposts were 0 and 100 percent.
4. Educational Attainment Index: The percent of individuals in the neighborhood having completed a high school degree or better. The respective minimum and maximum goalposts were 0 and 100 percent.
5. Employment Index: Percent of the population 16 years of age and older that is employed. The respective minimum and maximum goalposts were 0 and 100 percent.
6. School Quality Index: The standardized test score of the public elementary school that a child would be assigned to attend. Performance is measured by the percent of students at the school achieving the highest two stages (Stages 5 or 6) on the statewide Writing Assessment Exam. The respective minimum and maximum goalposts were 0 and 100 percent.

7. Home Value Index: The median price of a home in the Census Block Group. The minimum goalpost was $0 while the maximum goal posts were $139,800 for 1995 observations and $260,000 for 2001 observations. These values were based on doubling the median household values in the City of Atlanta.
8. Racial Dissimilarity Index: The index of dissimilarity is based on comparing the racial composition of the Census Block Group with that of Fulton County; the County encompassing the City of Atlanta. The index ranges from 0 to 1 with values approaching 1 indicating that a particular racial group (whether black, white or other) is more racially concentrated in the neighborhood than the County. The index value was subtracted from 1.
9. Affordability Index: The percent of AHA assisted families living in the Census Block Group who would have to spend more than one-third of their monthly income to rent an apartment priced at the median rent. The index value was subtracted from 1.

The NDI is the average of all the above indices. The QLI is the average of FDI and NDI.

Actual values for the five dimensions of the FDI are derived for each family by using AHA's administrative data. Observations on each family are taken at two points in time, December 1995 and December 2001. Values for the ten dimensions of the NDI are derived by geo-coding the family's address with the U.S. Census Block Group characteristics where the family resides. The NDI observations for 2001 are geo-coded with the 2000 Census Block Group characteristics while values for 1995 are geo-coded with the 1990 Census Block Group characteristics (See Boston, 2005).

Tables B.1 and B.2 in Appendices B show the FDI, NDI, and QLI calculated by Dr. Boston for the treatment group and the control group.

Our idea is to use a new variable NDIGAP to measure the individual's NDI change during 1995-2001, and thus NDIGAP could be a good "aggregate" indicator of this individual's immediate environmental change during this particular time period. To get a good "aggregate" estimator of the individual's attributes in 1995 highly influencing his/her employment status in 2001, we tentatively get another two new variables-self-distinguishing index (SDI) and self-selective index (SSI) involved, which are derived by following Dr. Boston's approach to FDI, NDI, and QLI. Certainly the person's selective attributes influenced his/her decision to move out from traditional public housing in 1995, no matter whether they moved voluntarily or were compelled to move. After this person moved out, the environment started to play an important role in forming his/her future employment status. Of course, it is entirely possible that the person's initial attributes in 1995 continued to play a joint role with the environment to make this more driven individual improve his/her socio-economic status faster than those who were endowed not-so-good attribute sets. It is also fairly possible that the environmental effect was so compelling that it made those who were not driven to fight for a better life in 1995 turn to have high drives to achieve and catch up very quickly in their socio-economic status. We consider both possibilities and reach our model as described below.

Using the odds of being employed in 2001 as the dependent variable, we have the self-selective index, the NDIGAP, an interaction term between the SSI and the NDIGAP, and whether one belongs to the treatment group in comparison to belonging to the control group as predictors.

First, the SDI is developed. After running a step-wise predictor selection, we produce the SDI within 6 dimensions as following:

1. Employment Index: This is used to measure whether the household head's primary source of income is from labor market services. The individual gets index 1 if yes and 0 otherwise.
2. Welfare Dependency Index: This is used to measure whether the household head's primary source of income is public assistance. The individual gets index 1 if no and 1 otherwise. Therefore, getting index 1 indicates a positive outcome.
3. Index of Household Income: There are two dimensions of household income. One is the total income, which is measured as total income of the household from all sources including TANF, social security, child support and others. The other is the earned income from labor services. One third of the index value is given to total income and two-thirds is given to earned income. The minimum goalpost was $0 while the maximum goalposts were $22,275 for 1995 observations and $34,770 for 2001 observations. These values are based on the median household income for the City of Atlanta.
4. Age Index: The minimum goalpost is 20 years while the maximum goal post is 87 years for 1995 observations. These values are based on the real minimum and maximum values of age revealed in the data set. The index value is subtracted from 1 so that higher values indicate more positive outcomes.
5. Tenure Index: This is used to measure how long the individual had been stayed in public housing projects up to 1995. The minimum goalpost is 1 year while the maximum goal post is 55 years for 1995 observations. These values are based on

the real minimum and maximum values of tenure revealed in the data set. The index value is also subtracted from 1 so that higher values likewise connote more positive outcomes.

6. Received Welfare Index: This is used to measure the welfare the person received relative to those others received in a given year, i.e.1995. The minimum goalpost is $0 while the maximum goalpost is $20684.8 for 1995 observations. These values are based on the real minimum and maximum values of welfare received by low-income adults revealed in the data set. The index value is subtracted from 1 as well.

SDI is calculated as the average of all the above indices. SSI is obtained by adding up three quarters of SDI and one quarter of FDI[8]. The reason behind is because one's incentive to move out and thus one's selective attributes also largely depends on one's immediate family situation.

The way where SSI differs from FDI and NDI-developed by Dr. Boston-is that it is measured at an even higher micro level, i.e. personal level. It gives more focus on each individual's particular situation, rather than the aggregate status of neighborhoods.

Like SSI, we recalculate NDI for each individual to reflect it at the personal level as well. Therefore our NDI is a little different from Dr. Boston's NDI, which he used to measure the aggregate status of particular neighborhoods.

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[8] The ratio is determined following the mechanism described below. By running regression with SDI and FDI separately first, we get the coefficients and significance for SDI and FDI respectively. After that, we compare SDI's coefficient weighted by its significance with FDI's coefficient weighted by its significance to determine the ratio.

With the purpose of measuring the environmental change, NDIGAP is employed simply as the difference between the individual's NDI in 1995 and in 2001. A positive NDIGAP indicates an improvement in one's immediate living environment while a negative one implies a deteriorative environment.

5.3 Separation of the Self-selective Effect from the Environmental Effect

The results displayed in Table 5.4 show that the individual's self selective index in 1995, the NDIGAP, and whether one belongs to the treatment group as opposed to the control group are highly significant. However, the interaction term between SSI95 and NDIGAP is not significant. Moreover, the coefficient and odds ratio of the interaction term do not make economic sense.

Table 5.4: Logistic Regression (A): Selective Effect and Environmental Effect in Influencing the Labor Force Participation

Dependent Variable: The Odds of Being Employed in 2001		Number of Observations: 1360
Log Likelihood = -796.67663		LR chi2(4) = 71.57
Variable	Coefficient	Odds Ratio
SSI95	6.08*** (1.46)	438.19*** (638.10)
NDIGAP	7.26* (4.39)	1429.38* (6281.66)
SSI95NDIGAPinteraction	-10.03 (8.53)	0.00 (0.00)
TREATMENTGvsControlG	0.23* (0.12)	1.26* (0.15)
CONSTANT	-4.33*** (0.75)	

Note: * indicates p-value<0.1 and *** indicates p-value < 0.001.

We exclude the interaction term to form a restricted model. After conducting a likelihood ratio test, the results show that the restricted model passes the test and indicates a good fit of data almost the same as the full model does. Table 5.5 shows that the chi-square statistic equals 1.38, which is statistically insignificant. This means that the variables that are removed to produce the reduced model result in a model that does not produce a poorer fit, and therefore the variables could be excluded from the model.

Table 5.5: Likelihood-ratio Test Results Indicating a Better Structured Restricted Model (B)

Likelihood-ratio Test Assumption: the restricted model is nested in the full model	LR chi2(1) = 1.38
	Prob > Chi2 = 0.2396

The restricted model is neater and each predictor becomes more significant due to the exclusion of the interaction term, as shown in Table 5.6.

Table 5.6: Logistic Regression (B): Selective Effect and Environmental Effect in Influencing the Labor Force Participation

Dependent Variable: The Odds of Being Employed in 2001		Number of Observations: 1360
Log Likelihood = -797.36816		LR chi2(4) = 70.19
Variable	Coefficient	Odds Ratio
SSI95	4.53*** (0.60)	92.46*** (55.17)
NDIGAP	2.19** (0.81)	8.98** (7.30)
TREATMENTGvsControlG	0.23* (0.12)	1.26* (0.15)
CONSTANT	-3.55*** (0.34)	

Note: * indicates p-value<0.1, ** indicates p-value < 0.01, and *** indicates p-value < 0.001.

Tables A.5-A.9 in Appendices A show the results of link test, the Hosmer and Lemeshow's goodness-of-fit test, the multicollinearity test, and the fit statistics. Although the link test and the goodness-of-fit test show significant test statistics, we think our approach is well-designed and well-founded. It makes good economic sense and produces nice results. There may be some trick to take in pursuing a well-balanced index system to make the final predictions fit the data well. Certainly, the best way to design these indices is still left to be found. The results of multicollinearity test show another strong evidence to support removing the interaction term from the model, as shown in Tables A.10 and A.11. Without the interaction term, small values of VIF and big values of tolerance indicate that there is no significant problem of multicollinearity in our final model. But the interaction term between SSI95 and NDIGAP brings in a too strong multicolliearity

problem and pushes the tolerance down to almost 0 and the VIF values up to more than 30.

To sum up, our results demonstrate that the separated self-selective effect and environmental effect are both significant, at the level of 0.001 and 0.01 respectively. Besides, people belonging to the treatment group have 26% more odds of being employed in 2001 than those who are assigned to the control group.

CHAPTER 6

CONCLUSION

The revitalization of distressed public housing projects led by AHA induced substantial changes to the living environments of many low-income adults in Atlanta. Our research results show significant improvement in a number of aspects of people's socio-economic status. The aggregate development can be seen by simply looking at the enhancement of FDI, NDI, and QLI during 1995-2001.

The study conducted in this paper mainly focuses on the improvement of labor force participation of low-income adults on public housing assistance. The scenario in Atlanta offered a great opportunity for experimental economists to collect a quasi-experimental data. By dividing 6 public housing projects into 2 groups to form a treatment group and a control group, we are able to measure the significance of over 70 variables in influencing the employment status of low-income adults. When the model finally reduces to having only 5 most important predictors, we clearly see the environmental effect matters much to lead to higher level of labor force participation.

Our study shows that the individual's current employment status, income, and years of age are great factors to predict his/her future employment status. Admittedly, this finding is not likely to shed too much light on the decisions of policy makers since those personal attributes are hard to change. However, the results also demonstrate that living in the mixed-income community as opposed to living in conventional public housing projects can boost one's odds of being employed in the future by 170% while using housing vouchers as opposed to living in traditional public housing can increase one's

odds of being employed by 90%. Both statistics are significant even at the 0.001 level. Hence, our findings strongly support the view that environment matters and distressed public housing projects should be revitalized, which has been a controversial topic over years.

Relying on a comprehensive index system, our tentative approach to separate the self-selective effect from the environmental effect in influencing the labor force participation offers nice results. Respectively, the SSI and NDIGAP aggregate individual's selective attributes and the environmental changes in many aspects. Those aggregate effects are demonstrated to be significant even at the 0.01 level. An interaction term between the selective attributes and the environmental changes is tested and shown to be insignificant and produce odd results. Therefore, we believe there is low level interaction between the self-selective effect and the environmental effect comparing to those two effects themselves. A side-finding is that, with the odds ratio of 1.26, those who are in the treatment group, i.e. those who are compelled to leave the conventional public housing projects have better odds to be employed in the future. Our conjecture is that this is due to that people who get pushed to some extent are more likely to fight for a better future.

Admittedly, this approach reveals some flaws at present, for instance, it may have some certain misspecification problem and does not seem to fit the data very well. But this approach makes good economic sense and produces nice results. We believe a better way of pursuing a well-balanced index system is still left to be found. Future investigation following this approach needs to be conducted to make better predictions.

APPENDICES A

DIAGNOSTIC TEST STATISTICS

Table A.1: Link Test Statistics (A)

Dependent Variable: The Odds of Being Employed in 2001	Number of Observations: 1376
Log Likelihood = -693.36189	LR chi2(2) = 298.09
Variable	Coefficient
PredictedValue	0.83*** (0.09)
PredictedValueSquared	-0.13** (0.05)
CONSTANT	0.05 (0.08)

Note: *** indicates significant at the 0.001 level and ** indicates significant at the 0.01 level.

Table A.2: Hosmer and Lemeshow's Goodness-of-fit Test Statistics (A)

Number of Observations = 1376			Number of Groups = 10			
Hosmer-Lemeshow Chi2(8) = 10.60			Prob > Chi2 = 0.2252			
Group	Prob	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.0513	1	4.4	137	133.6	138
2	0.1029	6	10.4	132	127.6	138
3	0.1603	20	17.9	117	119.1	137
4	0.2167	29	26.2	109	111.8	138
5	0.2805	36	34.4	102	103.6	138
6	0.3369	53	42.9	84	94.1	137
7	0.3967	47	50.5	92	88.5	139
8	0.4829	61	60.7	77	77.3	138
9	0.555	71	70.5	65	65.5	136
10	0.9219	91	96.9	46	40.1	137

Note: By combining the patterns formed by predictor variables into 10 groups and form a contingency table of 2 by 10, we made the table as above. Table collapsed on quantiles of estimated probabilities.

Table A.3: Multicollinearity Test Statistics (A)

Variable	VIF	SQRT VIF	Tolerance	R-Squared
EMPLOYED95	1.27	1.13	0.7843	0.2157
INCOME95	1.35	1.16	0.7404	0.2596
YEARSAGE95	1.19	1.09	0.8410	0.1590
MIXEDINC01	1.07	1.03	0.9371	0.0629
VOUCHER01	1.18	1.08	0.8496	0.1504
Mean VIF	1.44			

Table A.4: Fit Statistics (A)

Log-Lik Intercept Only:	-842.405	Log-Lik Full Model:	-696.918
D(1370):	1393.835	LR(5):	290.975
		Prob > LR:	0.000
McFadden's R2:	0.173	McFadden's Adj R2:	0.166
Maximum Likelihood R2:	0.191	Cragg & Uhler's R2:	0.270
McKelvey and Zavoina's R2:	0.325	Efron's R2:	0.188
Variance of y*:	4.873	Variance of error:	3.290
Count R2:	0.730	Adj Count R2:	0.106
AIC:	1.022	AIC*n:	1405.835
BIC:	-8507.067	BIC':	-254.840

Table A.5: Link Test Statistics (B)

Dependent Variable: The Odds of Being Employed in 2001	Number of Observations: 1360
Log Likelihood = -792.15144	LR chi2(2) = 80.62
Variable	Coefficient
PredictedValue	1.79*** (0.28)
PredictedValueSquared	0.64** (0.20)
CONSTANT	0.05 (0.12)

Note: *** indicates significant at the 0.001 level and ** indicates significant at the 0.01 level.

Table A.6: Hosmer and Lemeshow's Goodness-of-fit Test Statistics (B)

Number of Observations = 1360			Number of Groups = 10			
Hosmer-Lemeshow Chi2(8) = 55.46			Prob > Chi2 = 0.0000			
Group	Prob	Obs_1	Exp_1	Obs_0	Exp_0	Total
1	0.2008	27	24.2	109	111.8	136
2	0.2213	32	28.8	104	107.2	136
3	0.2373	31	31.1	105	104.9	136
4	0.2544	52	33.4	84	102.6	136
5	0.2710	46	35.8	90	100.2	136
6	0.2940	37	38.4	99	97.6	136
7	0.3179	27	41.6	109	94.4	136
8	0.3609	25	46.0	111	90.0	136
9	0.4763	41	55.6	95	80.4	136
10	0.6650	92	75.0	44	61.0	136

Note: By combining the patterns formed by predictor variables into 10 groups and form a contingency table of 2 by 10, we made the table as above. Table collapsed on quantiles of estimated probabilities.

Table A.7: Fit Statistics (B)

Log-Lik Intercept Only:	-832.463	Log-Lik Full Model:	-797.368
D(1370):	1594.736	LR(5):	70.190
		Prob > LR:	0.000
McFadden's R2:	0.042	McFadden's Adj R2:	0.037
Maximum Likelihood R2:	0.050	Cragg & Uhler's R2:	0.071
McKelvey and Zavoina's R2:	0.068	Efron's R2:	0.057
Variance of y*:	3.529	Variance of error:	3.290
Count R2:	0.734	Adj Count R2:	0.117
AIC:	1.178	AIC*n:	1602.739
BIC:	-8189.129	BIC':	-48.544

Table A.8: Multicollinearity Test Statistics (B)

Variable	VIF	SQRT VIF	Tolerance	R-Squared
SSI95	1.02	1.01	0.9775	0.0225
NDIGAP	1.01	1.01	0.9882	0.0118
TREATMENTGvsControlG	1.03	1.01	0.9744	0.0256
Mean VIF	1.02			

Table A.9: Multicollinearity Test Statistics (C)

Variable	VIF	SQRT VIF	Tolerance	R-Squared
SSI95	5.77	2.40	0.1732	0.8268
NDIGAP	30.68	5.54	0.0326	0.9674
SSINDIGAP	36.82	6.07	0.0272	0.9728
TREATMENTGvsControlG	1.03	1.01	0.9737	0.0263
Mean VIF	18.57			

APPENDICES B

SOME DESCRIPTIVE INDICES-FDI, NDI, AND QLI-OF THE TREATMENT GOUP AND THE CONTROL GROUP

Table B.1: FDI, NDI, and QLI of the Treatment Group

	1995 Housing Project	2001 Housing Project	2001 Voucher	2001 Mixed Income
Family Development index				
Employment index	0.14	0.2	0.41	0.46
Household income				
a. HH income index (1/3 weight)	0.13	0.14	0.16	0.16
b. Earned income index (2/3 weight)	0.22	0.25	0.57	0.5
Poverty index	0.09	0.09	0.31	0.33
Income Gap Ratio	0.43	0.48	0.45	0.54
Welfare Dependency Index	0.53	0.92	0.86	0.97
FDI	0.28	0.38	0.49	0.54
Neighborhood Development Index				
Poverty index	0.29	0.43	0.74	0.7
Welfare Dependency Index	0.56	0.83	0.91	0.95
School Attendance Rate Index	0.66	0.75	0.78	0.76
Employment Attainment Index	0.41	0.56	0.65	0.72
Employment Index	0.27	0.36	0.5	0.41
Employment Quality index	0.11	0.2	0.19	0.29
School Quality (5th Grade Writing)	0.31	0.45	0.38	0.47
Median Home value	0.34	0.61	0.29	0.59
Racial Diversity (1 less diverse)	0.45	0.5	0.49	0.47
Affordability Index: Rent <= 1/3 of income	0.38	0.2	0.09	0.19
NDI	0.38	0.49	0.5	0.55
QLI	0.33	0.43	0.5	0.55

Table B.2: FDI, NDI, and QLI of the Control Group

	1995 Housing Project	2001 Housing Project	2001 Voucher	2001 Mixed Income
Family Development index				
Employment index	0.17	0.29	0.49	0.80
Household income				
a. HH income index (1/3 weight)	0.20	0.19	0.26	0.21
b. Earned income index (2/3 weight)	0.25	0.34	0.61	0.83
Poverty index	0.09	0.18	0.37	0.20
Income Gap Ratio	0.44	0.48	0.51	0.67
Welfare Dependency Index	0.56	0.89	0.83	1.00
FDI	0.23	0.31	0.47	0.57
Neighborhood Development Index				
Poverty index	0.23	0.36	0.76	0.66
Welfare Dependency Index	0.45	0.80	0.92	0.95
School Attendance Rate Index	0.74	0.78	0.79	0.54
Employment Attainment Index	0.41	0.62	0.64	0.62
Employment Index	0.30	0.34	0.51	0.44
Employment Quality index	0.10	0.14	0.22	0.31
School Quality (5th Grade Writing)	0.25	0.38	0.38	0.55
Median Home value	0.38	0.25	0.30	0.30
Racial Diversity (1 less diverse)	0.52	0.45	0.51	0.52
Affordability Index: Rent <= 1/3 of income	0.50	0.64	0.92	1.00
NDI	0.38	0.48	0.59	0.59
QLI	0.31	0.39	0.53	0.58

REFERENCES

Atlanta Housing Authority (AHA) 1993. "Urban Revitalization Demonstration Implementation Grant Application for Techwood/Clark Howell Homes," May 26, 1993. Atlanta AHA.

Bauman, J.F. 1987. *Public housing, race, and renewal: Urban planning in Philadelphia, 1920-1974.* Philadelphia: Temple University Press.

Boston, T. D. 2005. "Environment matters: The effect of mixed-income revitalization on the socio-economic status of public housing residents, A Case Study of Atlanta," (Working Paper #1), Atlanta, GA: Georgia Institute of Technology, School of Economics.

Boston, T. D. 2005. "The Effects of Revitalization on Public Housing Residents, A Case Study of the Atlanta Housing Authority," *Journal of the American Planning Association*, Vol. 71, No. 4, Autumn 2005.

Brooks, Fred, Jim Wolk and Mary Adams. 2003. "Evaluation of Performance and Impact of HOPE VI Community Revitalization (Harris Homes) Evaluation of Relocation Services," Atlanta, AHA, July 15, 2003.

Brooks-Gunn, Jeanne, Greg J. Duncan, Pamela Kato-Klebanov and Naomi Sealand. 1993. "Do Neighborhoods Influence Child and Adolescent Development?" *The American Journal of Sociology*, Vol. 99(2) pp. 353-395.

Buron, Larry, Susan Popkin, Diane Levy, Laura Harris and Jill Khadduri. 2002. "The Hope VI Resident Tracking Study: A Snapshot of the Current Living Situation of Original Residents from Eight Sites," prepared for the U.S. Department of Housing and Urban Development.

Case, Anne C. and Lawrence Katz F. 1991. "The Company You Keep: The Effects of Family and Neighborhood on Disadvantaged Youth," NBER Working Paper 3705. Cambridge, MA: National Bureau of Economic Research.

Clampet-Lundquist, S. 2004. "Moving Over or Moving Up? Short-Term Gains and Losses for Relocated HOPE VI Families," *Citiscape*, Volume 7, Number 1 2004: 57-80.

Ellen, Ingrid Gould and Margery Austin Turner. 1997. “Does Neighborhood Matter? Assessing Recent Evidence,” *Housing Policy Debate* 8(4): 833-866.

Epp, Gale. 1998. “Emerging strategies for revitalizing public housing communities,” In New Directions in urban public housing, edited by D.P. Varady, W.F. Preiser, and F.P. Russell. New Brunswick, NJ: Center for Urban Policy Research, Rutgers University.

Goetz, Edward. 2003. *Clearing the Way: Deconcentrating the Poor in Urban America*, Washington, DC: The Urban Institute Press.

Holmes, Bob, Mitch Moody, Andy Hill, Cheryl Hardison-Dayton, Mykia Green, Rashid Herd, Elias Sisya and Jeffrey Williams. 2003. “The Capitol Homes HOPE VI Evaluation Baseline Study,” Atlanta Housing Authority. August 2003.

Jack Pransky, 1998. *Modello, A Tale of Hope for the Inner City and Beyond: An Inside-Out Model of Prevention and Resiliency in Action through Health Realization*, NEHRI Publications 1998.

Jacob, Brian A. 2004. “Public Housing, Housing Vouchers, and Student Achievement: Evidence from Public Housing Demolitions in Chicago.” *The American Economic Review* 98(1): 233-257.

Jargowsky, P.A. 1997. “Poverty and Place: Ghettos, Barrios and the American City,” New York: Russell Sage Foundation.

Keating, Larry. 2000. “Redeveloping Public Housing: Relearning Urban Renewal’s Immutable Lessons,” *APA Journal* 66(4): 384-397.

Keating, Larry and C. A. Flores. 2000. “Sixty and Out: Techwood Homes Transformed by Enemies and Friends,” *Journal of Urban History* 26(3): 275-311.

Kingsley, G.T., J. Johnson, and K.L.S. Pettit. 2002. “Spatial patterns in relocation: HOPE VI relocation national study,” Paper presented at the Urban Affairs Annual Meeting, March 2002, Washington, DC.

National Housing Law Project. 2002. *False HOPE: A critical assessment of the HOPE VI Public Housing Redevelopment Program*, Press Release. June 2002.

Oreopoulos, Philip. 2003. "The Long-Run Consequences of Living in a Poor Neighborhood," *Quarterly Journal of Economics*, November 2003 pp. 1533-1575.

Orr, L., J. Feins, R. Jacob, E. Beecroft, L. Sanbonmatsu, L. Katz, J. Liebman, and J. Kling. 2003. *Moving to Opportunity: Interim impacts evaluation*, Washington, DC: U.S. Department of Housing and Urban Development, Office of Policy Development and Research.

Popkin, S., J. Rosenbaum, and P. Meaden. 1993. "Labor market experiences of low-income black women in middle-class suburbs: Evidence from a survey of Gautreaux program participants," *Journal of Policy Analysis and Management* 12(3): 556-573.

Rubinowitz, L.S., and J. E. Rosenbaum. 2000. *Crossing the class and color lines: From public housing to white suburbia*, Chicago: The University of Chicago Press.

Schussheim, Morton. 2000. *Housing the Poor: Federal Programs for Low-Income Families*, CRS Report for Congress, RL30486. Congressional Research Service, the Library of Congress.

Schwartz, Alex and Kian Tajbakhsh. 1997. "Mixed-income Housing: Unanswered Question," *Cityscape: A Journal of Policy Development and Research* 3(2): 71-92.

Susan J. Popkin, Bruce Katz, Mary K. Cunningham, Karen D. Brown, Jeremy Gustafson, and Margery A. Turner. 2004. *A Decade of HOPE VI: Research Findings and Policy Challenges*, Washington, DC: The Urban Institute, 2004.

Thirwall, A.P. 2003. "Growth and Development: With Special Reference to Developing Economics," New York: Palgrave MacMillan.

United Nations Development Program (UNDP). 2003. Human Development Report, 2003, "Millennium Development Goals: A Compact among Nations to End Human Poverty," Technical Note 1, pp340-344. New York: United Nations.

U.S. General Accounting Office (GAO). 2003. "Public Housing: HOPE VI Resident Issues and Changes in Neighborhoods Surrounding Grant Sites," GAO-04-109. A Report to Ranking Minority Member, Subcommittee on Housing and Transportation, Committee on Banking, Housing, and Urban Affairs, U.S. Senate. Washington, DC. November 2003.

Vale, Lawrence J. 2002. *Reclaiming Public Housing: A Half a Century of Struggle in Three Public Neighborhoods*, Cambridge, MA: Harvard University Press.

Welfeld, I. 1998. *Gautreaux: Baby Steps to Opportunity in New Directions in Urban Public Housing*, edited by D.P. Varady, W.F.E. Preiser, and F.P. Russell. New Brunswick, NJ: Center for Urban Policy Research Press.

Wilson, W. J. 1997. *When Work Disappears,* New York: Vintage.

Wilson, W. J. 1991. "Studying the Inner-city Social Dislocations: The Challenge of Public Agenda Research," *American Sociological Review*, 56(1) 1-14.

Wilson, W. J. 1987. *The truly disadvantaged: The inner-city, the underclass, and public policy*, Chicago: University of Chicago Press.